

CLAIMS

1. A two-shaft hinge having a rotation shaft and an opening/closing shaft, comprising: a rotation torque unit in which a plurality of rotation torque generating portions are provided on the rotation shaft, the rotation torque generating portion being assembled by putting a coil spring around an outer periphery of the rotation shaft having a penetrating hole and by abutting a fixing cam and a rotating cam on both ends of the coil spring; and an opening/closing torque unit in which a plurality of opening/closing torque generating portions are provided on the opening/closing shaft, the opening/closing torque generating portion being assembled by putting a coil spring around the opening/closing shaft and by abutting a fixing cam and a rotating cam on both ends of the coil spring; wherein, the two-shaft hinge has a two-shaft structure in which an axial direction of the rotation shaft and an axial direction of the opening/closing shaft are assembled to a hinge housing to be perpendicular to each other, the torque units which generate a sliding torque and a click torque at rotation and opening/closing operation function on the rotation shaft and the opening/closing shaft, and the opening/closing torque unit is assembled to either side or both right and left sides of the rotation torque unit.

2. A two-shaft hinge having a rotation shaft and an opening/closing shaft, comprising: a rotation torque unit in which a pair of rotation torque generating portions are provided on the rotation shaft, the rotation torque generating portion being assembled by putting a coil spring around an outer periphery of the rotation shaft having a penetrating hole and by abutting a fixing cam and a rotating cam on one end of the coil spring; and an opening/closing torque unit in which a plurality of opening/closing torque

generating portions are provided on the opening/closing shaft, the opening/closing torque generating portion being assembled by putting a coil spring around the opening/closing shaft and by abutting a fixing cam and a rotating cam on both ends of the coil spring; wherein, the two-shaft hinge has a two-shaft structure in which an axial direction of the rotation shaft and an axial direction of the opening/closing shaft are assembled to a hinge housing to be perpendicular to each other, the torque units which generate a sliding torque and a click torque at rotation and opening/closing operation function on the rotation shaft and the opening/closing shaft, and the opening/closing torque unit is assembled to either side or both right and left sides of the rotation torque unit.

3. The two-shaft hinge according to claim 1 or claim 2, wherein the sliding torque and the click torque are generated by abutting the fixing cam and the rotating cam in the plurality of rotation torque generating portions provided on the rotation shaft, and positions of a groove (concave) and a protrusion (convex) of the cams used by the rotation shaft by pair and/or a different number of cams are combined, whereby the rotation torque unit which incorporates with the plurality of rotation torque generating portions having different torque generation operations is formed, and the torque unit is assembled on the rotation shaft.

4. The two-shaft hinge according to claim 1 or claim 2, wherein the sliding torque and the click torque are generated by abutting the fixing cam and the rotating cam in the plurality of opening/closing torque generating portions provided on the opening/closing shaft, and positions of a groove (concave) and a protrusion (convex) of the cams used by the opening/closing shaft by pair and/or a different number of cams are combined, whereby the opening/closing

torque unit which incorporates with the plurality of opening/closing torque generating portions having different torque generation operations is formed, and the torque unit is assembled on the opening/closing shaft.

5. The two-shaft hinge according to claim 1 or claim 2, wherein a part of a cross section of the rotation shaft and the opening/closing shaft is formed to be a quadrangle or to have a major axis and a minor axis, which is other than a circle, and the rotation shaft and the opening/closing shaft having a shape which allows the fixing cams for rotation and opening/closing used in the rotation and the opening/closing torque generating portions to move in an axial direction of the rotation shaft and the opening/closing shaft but which inhibits them from rotating on a periphery of the rotation shaft, are employed.

6. The two-shaft hinge according to claim 1 or claim 2, wherein a stopper mechanism to restrict a rotation angle and an opening/closing angle of the rotation shaft and the opening/closing shaft is mounted so that a rotation range of the rotation shaft and the opening/closing shaft is restricted.

7. The two-shaft hinge according to claim 1 or claim 2, wherein a disc spring, a waved plate spring, or a thin plate spring is employed in place of the coil spring which generates an abutting force in the torque generating portions used in the rotation torque unit and the opening/closing torque unit, so that a size is reduced.

8. The two-shaft hinge according to claim 1 or claim 2, wherein a penetrably holed shaft in which a through-hole is provided at a center of the rotation shaft is used to enable

a harness wiring.

9. The two-shaft hinge according to claim 1 or claim 2, wherein a case for the rotation shaft and a case for the opening/closing shaft in each of which an outer periphery thereof partially has a groove or a deformed cross section other than a circle are fitted with or fixed to the rotating cams in each of which an outer periphery thereof has a protrusion or a deformed cross section, in order to effectively transmit a sliding torque force and a click torque force, which are generated in the rotating cams used on the rotation shaft and the opening/closing shaft.

10. The two-shaft hinge according to claim 1 or claim 2, wherein the rotating cam used in the rotation torque generating portion is configured to be another member as a bottom portion to which the rotation torque unit is fitted and attached in the hinge housing, whereby reduction in a number of components, reduction in size, and improvement in strength of the hinge housing are achieved.

11. The two-shaft hinge according to claim 1 or claim 2, wherein the rotation torque unit and the opening/closing torque unit are assembled as an independent unit, thereafter they are fitted and attached to or screwed into the hinge housing in which a means for fitting or screwing to fix is provided in advance.

12. The two-shaft hinge according to claim 1 and claim 2, wherein, for mounting and fixing the two-shaft hinge to a device chassis, a fixing base component adhered to the rotation shaft is added and the two-shaft hinge is fixed by the base, whereby the device chassis is designed easily.